Abstract Title Page
Not included in page count.

Title: The Sustained Effects of a Brief Self-Affirmation Intervention on Students' Academic Outcomes across Middle and High School

Authors and Affiliations:
Geoffrey D. Borman, gborman@education.wisc.edu- Contact
University of Wisconsin—Madison

Jeffrey Grigg, jgrigg1@juh.edu
Johns Hopkins University

Chris Rozek, crozek@wisc.edu
University of Wisconsin—Madison

Paul Hanselman, paul.hanselman@uci.edu
University of California, Irvine

Abstract Body

Limit 4 pages single-spaced.

Background / Context:

The key policy issue we propose to address is closing the academic performance gaps between African American and Latino students and their White counterparts. Of the various models and theories of these social inequalities that have been advanced in the literature, one particularly compelling line of research concerns the idea of *stereotype threat*. Steele and Aronson (1995), who coined the term, have referred to stereotype threat as the apprehension individuals experience when confronted with a personally relevant stereotype that threatens their social identity or self-esteem. Stereotype threat is predicated on the notion that people often fear behaving in a way that fits the negative cultural image associated with a group stereotype, thereby marking them as inferior. This largely unconscious fear elicits anxiety and other counterproductive responses that can severely interfere with thinking and performance on standardized tests or other evaluative activities in the classroom. Perhaps most importantly, and consistent with the conference theme, are the long-term impacts of stereotype threat on threatened students' academic transitions and outcomes. Indeed, as this threat persists over time, Steele and Aronson argue that it may have the further effect of pressuring these students to protectively disidentify with school and related intellectual domains, ultimately contributing to widening achievement gaps, greater risk for course failure, and dropping out of school.

However, a number of research programs suggest that brief expressive writing exercises aimed at reducing stereotype threat can attenuate its effects in school-based contexts (Cohen, Garcia, Apfel, & Master, 2006; Good et al., 2003; Walton & Cohen, 2007), yielding important gains in test scores and grade point average (GPA) (see Yeager & Walton, 2011 for a recent review). Specifically, individuals can manage threatening situations by shoring up their self-concept—a strategy known as "compensatory self-inflation" (Greenberg & Pyszczynski, 1985) or "self-affirmation" (Steele & Lui, 1983; Lui & Steele, 1986). Though the writing exercises are brief, there is substantial evidence that these one-time psychological interventions can have generalized and long-lasting effects for months or even years (Weick, 1984; Yeager & Walton, 2011; Walton, 2014). The feedback loop between students' attitudes and their performance is one important aspect of this process. If an intervention reduces stereotype threat and general anxiety before a test and boosts performance on that test, then that seemingly "small win" can reduce an individual's fear of fulfilling negative stereotypes and improve future performance in evaluative situations (Weick, 1984). Though there is some evidence that expressive writing yields long-term cognitive and health benefits (e.g., Pennebaker, 1997) and that social-psychological interventions can have lasting effects on academic performance (Jamieson et al., 2010), no prior field studies have examined the long-term intervention effects in schools.

Purpose / Objective / Research Question / Focus of Study:

One recent field-based trial of self-affirmation exercises, in particular, cries out for replication because it is so simple and effective and has, as a consequence, garnered a great deal of both attention and skepticism. In results published in *Science*, Cohen and colleagues (Cohen et al., 2009; Cohen et al., 2006; WWC, 2010) reported that brief self-affirmation tasks aimed at affirming students' personal values reduced the Black–White GPA gap by as much as 40%, or 0.50 *SDs*, by improving the African American students' performance. During the 2011-2012 school year, we randomly assigned seventh-grade students across all 11 Madison middle schools

to receive this stereotype threat–reduction intervention or a non-affirming control exercise. We found statistically significant treatment effects on GPA, which narrowed Black-White and Latino-White performance gaps by approximately 20% (Hanselman, Bruch, Gamoran, & Borman, 2014). Subsequently, we have tracked this longitudinal sample of nearly 1,000 students through the transition to high school and the completion of ninth grade. Our current work reported here examines the extent to which these initial impacts on middle-school GPAs persist through ninth grade.

Setting:
The research was conducted in the Madison Metropolitan School District (MMSD) school district during the 2011-2012 through 2013-2014 academic years. All eleven of the district's middle schools participated in the study. To date, this is the first district-wide, "scale-up" evaluation of the impacts of self-affirmation writing exercises.

Population / Participants / Subjects:
Approximately 1,700 seventh grade students were enrolled in the district; all were invited to participate. Parent consent and student assent was obtained for 1,049 students (61% of the total district enrollment), 943 of whom were enrolled in the study prior to the first administration of the writing exercise at their school. GPA data from sixth through ninth grade were available for 927 students, representing 55% of the district's total seventh grade enrollment. As the descriptive data in Table 1 suggest, the analytical sample is 50% female, 42% eligible for free/reduced lunch (FRL), 13% eligible for special education services, and students of Asian, Black, Hispanic, and White backgrounds are included in the sample. Based on prior research, we hypothesized equivalent treatment effects across racial/ethnic groups sensitive to negative stereotypes within the academic domain.[1] Therefore, we label our combined sample of Latino and African American students as "potentially threatened" and the combined sample of White and Asian students as "potentially non-threatened."[2]

Half of the consented students were randomly assigned to receive the self-affirmation writing exercise, and half of the students were assigned to a similar exercise that asked students to write about things that might be important to other people. All baseline characteristics of treatment and control students were statistically equivalent. The overall student attrition rate was 12%, with a statistically equivalent attrition rate of 12% across treatment and control conditions. The two groups forming the analytical sample are balanced on the whole, with respect to demographic characteristics and pre-intervention sixth-grade GPA.

Intervention / Program / Practice:
The intervention was a self-affirmation writing exercise developed by Geoffrey Cohen and his colleagues (Cohen et al., 2006). We produced personalized copies with the student's name on a cover sheet in order to maintain the fidelity of the random assignment. The assignments were distributed by classroom teachers and completed during the school day, either in homeroom or in Language Arts; each administration took about 15-20 minutes. Students completed the

[1] Specifically, the magnitude of the GPA impact for potentially stereotype-threatened African American students (Cohen et al., 2009) was similar to that found for potentially threatened Latino students (Sherman et al., 2013).
[2] We conducted analyses with "multiracial" students identified as "potentially threatened" if Black and/or Hispanic was indicated as one of the multiple races identified.

assignments quietly and independently, and teachers were not informed of the condition to which their students were assigned. Students were also blind to their condition.

Students completed up to four writing exercises during the 2011-2012 academic year. The timing of the exercise administration, which was intended to precede major assessments, is shown in Figure 1. On the first page of the exercise, students were presented with a list of things that could be important to them or to other people (e.g., Friends and Family, Music, Religion, etc.). Students in the intervention condition were asked to select two or three items that were *most* important to them. Students in the comparison condition were asked to select two or three items that were *least* important to them. The intervention group was then asked to write a brief essay explaining how those things were important to them, and the comparison group was asked to write a brief essay about how the things that are not important to them might be important to someone else. The second writing exercise introduced school performance to the list of potentially important things. The third writing exercise reviewed the list of potentially important things, and the fourth writing exercise identified one of the items that students selected early in the year and asked them to reflect on it.

Research Design:
Within each of the 11 middle schools, half of the consented seventh grade students were randomly assigned to the intervention group. Consequently, students in both the intervention and comparison groups shared classrooms. Non-consented students were given an expository writing assignment to complete. The current analysis focuses on the enduring impacts for the students who were enrolled in the study in seventh grade during 2011-2012 and randomly assigned to either the intervention or comparison group prior to the first administration of the writing exercise at their school. Given the potential for enduring effects of relatively brief mindset interventions (Weick, 1984; Yeager & Walton, 2011; Walton, 2014), we hypothesized that the impacts of the seventh-grade self-affirmation treatment would persist through the transition to high school and completion of ninth grade. We assess the originally enrolled students' ninth-grade GPA and whether the students failed a class during ninth grade as our academic outcomes. The self-affirmation interventions were administered during the course of seventh grade, and all of the eighth grade outcomes are observed after the intervention was complete.

Data Collection and Analysis:
We compute student GPA using weighted course grades from student transcript data across sixth through ninth grade. Student middle-school grades are recorded across four quarterly terms, and high school grades are recorded only twice, at the end of winter and spring semester. For each term, the transcript records each course the student was enrolled in, the weight of the course, and the letter grade the student earned. "Core" courses that meet daily (e.g., English/Language Arts or Mathematics) are given a weight of 0.25 per term. Elective courses that meet more or less often have different weights; for example, Chorus, which meets two days a week, has a weight of 0.10. Students receive grades of A, B, C, D, or U (Unsatisfactory). Following MMSD protocol, we convert the letter grade into a score (e.g., A = 4, B = 3, etc.) and then create a weighted average to compute the GPA in a given term. Term grades are then averaged to create a GPA for a given academic year. We also identified students who failed one or more courses during ninth-grade. Table 2 displays the GPA data and frequency of students with at least one failed course during ninth grade. All transcript data and demographic information were provided by MMSD.

The current analysis is the estimated impact of assignment to the intervention, or the intention-to-treat (ITT) analysis. We estimate the impact of assignment using the following multilevel model of students nested within the eleven schools:

$$GPA_{ij} = \alpha + \beta(Affirmed_{ij}) + \gamma(Affirmed_{ij} * Threatened_{ij}) + \sum \delta X_{ij} + u_j + \varepsilon_{ij}$$

In this model, GPA_{ij} represents the student GPA outcome in ninth grade, α represents the model intercept (the grand mean for the reference group), β is the coefficient representing the impact of self-affirmation for the reference (not potentially threatened) group, γ represents the interaction between self-affirmation and membership in a racial/ethnic group (i.e., Black or Hispanic) potentially subject to stereotype threat, $\sum \delta X_{ij}$ includes the set of covariates in the model (i.e., membership in a potentially threatened group, sixth-grade preintervention GPA, gender, FRL status, limited English proficiency, and special education status), u_j is the school-specific error, and ε_{ij} is the student-specific error term. A multilevel logistic regression model for the dichotomous outcome of failing one or more courses in ninth grade was also specified. This model estimates the odds of failing a course in ninth grade. Because the intervention is hypothesized to impact students subject to stereotype threat, we expect the effects to be revealed by the interaction terms (γ) rather than by the overall average treatment effect estimates (β).

Findings / Results:

The results of the analyses are reported in Tables 3 and 4. As expected, we did not find an overall average effect of assignment to the self-affirmation condition. We did find, however, that students' potentially threatened status moderated the impact of self-affirmation for both ninth-grade outcomes. For ninth-grade GPA, we found an intention-to-treat effect equivalent to an effect size of $d = 0.30$. As shown in Table 3, this observed impact compares favorably to the prior treatment effects found for potentially threatened students in seventh grade ($d = 0.14$), and eighth grade ($d = 0.20$).[3] In addition, we found a statistically significant interaction between treatment, potentially threatened groups, and time, which suggests that the intervention helps to halt academic declines over time, and a significant reduction in the odds that potentially stereotyped students failed a ninth-grade course.

Conclusions:

Related to the conference theme, our large-scale replication produced results that suggest a brief, but theoretically precise, mindset intervention can have enduring impacts that span across the transition from middle to high school. Indeed, the evidence suggests that the impacts increase over time, despite that the intervention was offered for only one year, during the seventh grade. As Yeager and Walton (2011) contend, "it is by affecting self-reinforcing recursive processes that psychological interventions can cause lasting improvements in motivation and achievement even when the original treatment message has faded in salience." This outcome suggests that apparently subtle mindset interventions that spark small but early alterations in trajectory can have long-term effects that endure across several years and across key schooling transitions.

[3] We are also estimating three-level longitudinal growth models for GPA, with the four quarterly GPAs from seventh and eighth grade, and the two semester-end GPAs from ninth grade nested within students, and students nested within schools. This analysis will be completed in time for the conference presentation.

Appendices

Not included in page count.

Appendix A. References

Cohen, G. L., Garcia, J., Apfel, N., & Master, A. L., (2006). A self-affirmation intervention to reduce the racial achievement gap. *Science, 313*, 1307–1310.

Cohen, G. L., Garcia, J., Purdie-Vaughns, V., Apfel, N., & Brzustoski, P. (2009). Recursive processes in self-affirmation: Intervening to close the minority achievement gap. *Science*, *324*, 400–403.

Greenburg, J., & Pyszczynski, T. (1985). Compensatory self-inflation: A response to the threat to self-regard of public failure. *Journal of Personality and Social Psychology*, 49(1), 273-280.

Hanselman, P., Bruch, S.K., Gamoran, A., & Borman, G.D. (2014). Threat in context: School moderation of the impact of social identity threat on racial/ethnic achievement gaps. *Sociology of Education, 87,* 106-124.

Liu, T. J., Steele, C. M. (1986). Attributional analysis as self-affirmation. *Journal of Personality and Social Psychology*, 51(3), 531-540.

Sherman, D.K., Hartson, K.A., Binning, K.R., Purdie-Vaughns, V., Garcia, J., Taborsky-Barba, S., Tomassetti, S., Nussbaum, A.D., & Cohen, G.L. (2013). Deflecting the trajectory and changing the narrative: How self-affirmation affects academic performance and motivation under identity threat. *Journal of Personality and Social Psychology 104,* 591-618.

Steele, C. M., & Aronson, J. (1995). Stereotype threat and the intellectual test performance of African Americans. *Journal of Personality and Social Psychology, 69*, 797–811.

Steele, C. M., & Aronson, J. (2004). Stereotype threat does not live by Steele and Aronson (1995) alone. *American Psychologist,* 59(1), 47-48.

Steele, C. M., Liu, T. J. (1983). Dissonance processes as self-affirmation. *Journal of Personality and Social Psychology*, 45(1), 5-19.

Walton, G. M., & Cohen, G. L. (2007). A question of belonging: Race, social fit, and achievement. *Journal of Personality and Social Psychology, 92*, 82–96.

Walton, G. M., & Spencer, S. J. (2009). Latent ability: Grades and test scores systematically underestimate the intellectual ability of negatively stereotyped students. *Psychological Science, 20,* 1132-1139.

What Works Clearinghouse. (2010). *WWC quick review of the article "Recursive processes in self-affirmation: intervening to close the minority achievement gap."* Retrieved from http://ies.ed.gov/pubsearch/pubsinfo.asp?pubid=WWCQRRP0210

Yeager, D.S., & Walton, G.M. (2011). Social-psychological interventions in education: They're not magic. *Review of Educational Research, 81,* 267-301.

Appendix B. Tables and Figures

Not included in page count.

Table 1: Characteristics of the Analytical Sample

	Mean	s.d.	Min	Max
Self-Affirmation	0.50	0.50	0	1
Potentially Threatened	0.35	0.48	0	1
Female	0.50	0.50	0	1
Free/Reduced Price Lunch	0.42	0.49	0	1
Limited English Proficiency	0.15	0.36	0	1
Special Education Services	0.13	0.34	0	1
Black	0.18	0.39	0	1
White	0.75	0.43	0	1
Hispanic	0.17	0.38	0	1
Asian	0.11	0.31	0	1
Multiracial	0.07	0.25	0	1
6th Grade GPA	3.26	0.64	0.81579	4

Notes: N = 927. Race/ethnic categories are not mutually exclusive and add up to more than 100%; Hispanic students are also classified as White for descriptive purposes.

Table 2: 9th Grade Academic Outcome Variables

	Mean	s.d.	Min	Max
GPA	2.92	1.02	0	4
Course Failure in 9th Grade	0.24	0.43	0	1

Notes: N = 927.

Table 3: Self-Affirmation Impacts for Potentially Threatened Students through 9th Grade (Grades 7 & 8 Provided for Reference)

	Gr. 7 GPA	Gr. 8 GPA	Gr. 9 GPA
Self-Affirmation	-0.016	0.029	0.029
	[-0.047,0.015]	[-0.010,0.068]	[-0.035,0.094]
Self-Affirmation * Potentially Threatened	0.087*	0.130*	0.179*
	[0.008,0.166]	[0.028,0.232]	[0.004,0.354]
Potentially Threatened	-0.107***	-0.167**	-0.271**
	[-0.169,-0.044]	[-0.274,-0.060]	[-0.441,-0.101]
6th Grade GPA	0.353*	0.464**	0.635
	[0.054,0.653]	[0.135,0.793]	[-0.089,1.360]
(6th Grade GPA)^2	0.102***	0.071*	0.085
	[0.049,0.154]	[0.014,0.129]	[-0.027,0.197]
Female	0.069***	0.121***	0.055
	[0.038,0.100]	[0.089,0.152]	[-0.004,0.115]
Free/Reduced Price Lunch	-0.132***	-0.127***	-0.226***
	[-0.204,-0.061]	[-0.189,-0.065]	[-0.334,-0.118]
Limited English Proficiency	0.071*	0.171**	0.208*
	[0.011,0.131]	[0.052,0.290]	[0.047,0.370]
Special Education Services	0.03	0.037	0.346***
	[-0.079,0.139]	[-0.099,0.172]	[0.203,0.488]
Intercept	0.931***	0.823***	-0.082
	[0.496,1.367]	[0.400,1.247]	[-1.157,0.994]
ln(Var(Schools))	0.019***	0.017***	0.042***
	[0.009,0.041]	[0.008,0.036]	[0.024,0.071]
ln(Var(Students))	0.104***	0.166***	0.410***
	[0.090,0.119]	[0.138,0.198]	[0.351,0.478]

Notes: Multilevel model with students nested within middle schools. N = 927. 95% confidence intervals in brackets; * p<0.05, ** p<0.01, *** p<0.001.

Table 4: Estimated Impact of Self-Affirmation on the Odds of Failing a Course in 9th Grade

	Failing Grade in Ninth Grade
Self-Affirmation	0.371
	[-0.079,0.821]
Self-Affirmation * Potentially Threatened	-0.645*
	[-1.285,-0.005]
Potentially Threatened	0.163
	[-0.350,0.675]
6th Grade GPA	2.825**
	[0.889,4.762]
(6th Grade GPA)^2	-0.902***
	[-1.240,-0.565]
Female	0.097
	[-0.196,0.390]
Free/Reduced Price Lunch	0.378
	[-0.248,1.004]
Limited English Proficiency	-0.662***
	[-0.987,-0.338]
Special Education Services	-0.878**
	[-1.545,-0.211]
Intercept	-1.589
	[-4.524,1.346]
ln(Var(Schools))	0
	[-0.000,0.000]

Notes: Multilevel logistic regression model with students nested within middle schools. N = 839. 95% confidence intervals in brackets; * p<0.05, ** p<0.01, *** p<0.001.

Figure 1: Timing of Interventions During the Seventh Grade Year